deposits.[45] Borrowings produce most of the interest sensitivity of the free reserve ratio; they fluctuate much more over business cycles than total reserves do.[46] These studies are not relevant, therefore, to the relation between interest rates and the total or usable reserve ratio.

We may conclude that cyclical fluctuations in the reserve ratio mainly reflect business conditions, not the cost of holding reserves, insofar as the two differ, as they often do. Apparently banks find their reserves reduced below a comfortable minimum near reference cycle peaks, possibly because they have been loath to deny loan applications by valued customers enjoying prosperity, and take the first opportunity in a business downturn to replenish reserves. The build-up is moderate and does not go far, if currency drains in the absence of a panic are light. The increase exceeds original plans during the ensuing low points of business activity, presumably because loan demands become unexpectedly small.

For these and perhaps other reasons, banks contribute to variations in the rate of growth of the money stock. The reserve ratio displays considerable irregularity, shown in the patterns for individual cycles in Chart 21. There is nevertheless a typical pattern. When business recovers, the reserve ratio begins to decline and apparently continues until the banks' desired minimum level is reached. In the vicinity of that minimum, the rate of decline in the reserve ratio decreases and so contributes to a reduced rate of growth of the money stock. Whether the ratio rises or remains more or less constant until the onset of a reference contraction, it generally rises thereafter and so contributes to a decline in the rate of growth of the money stock. Its average pattern in Chart 2 shows that the reserve ratio played a major part in forming peaks in specific cycles of the money series but a minor one, if any, in forming troughs except in panic cycles.

[45] See, for example, J. J. Polak and W. H. White, "The Effect of Income Expansion on the Quantity of Money," *Staff Papers*, IV., International Monetary Fund, 1954–55, pp. 398–433, Chart 8; and A. J. Meigs, *Free Reserves and the Money Supply*, Chicago University Press, 1962.

There is also a close relation between call money rates and the reserve ratio of New York Clearing House Banks during the pre-1914 period, though the relation is poor for all national banks (See W. M. Persons, "Cyclical Fluctuations of the Ratio of Bank Loans to Deposits, 1867–1924," *Review of Economic Statistics*, Oct. 1924, pp. 260–283).

No studies have separated the effect of interest rates on bank reserves and the effect of reserves and bank credit on interest rates. The observed relation undoubtedly reflects both.

[46] See article in *Monthly Review*, Federal Reserve Bank of New York, Nov. 1958, pp. 162–167.